DISCUSSION OF THE AMENDMENT

Due to the length of the specification herein, Applicants will cite to the paragraph number of the published patent application (PG Pub) of the present application, i.e., US 2008/0287606, when discussing the application description, both in this section and in the Remarks section, *infra*, rather than to page and line of the specification as filed.

Claims 1 and 8 have been amended to make implicit what was at least implicit, as supported in the specification at paragraphs [0019] and [0023]. Remaining amendments are to correct typographical errors.

No new matter is believed to have been added by the above amendment. Claims 1-20 remain pending in the application.

REMARKS

Applicants thank the Examiner for the courtesy extended to Applicants' attorney during the interview held July 28, 2009, in the above-identified application. During the interview, Applicants' attorney explained the presently-claimed invention and why it is patentable over the applied prior art. The discussion is summarized and expanded upon below.

The rejections of Claims 1-20 under 35 U.S.C. § 102(b) as anticipated by, and under 35 U.S.C. § 103(a) as unpatentable over, US 5,612,406 (Frings et al), is respectfully traversed.

As Applicants' attorney pointed out during the above-referenced interview, Frings et al is from the same patent family as EP 0522675, which is described in the specification herein at paragraph [0014] as disclosing the use of azo initiators attached to polyurethanes for preparing block copolymers. Frings et al discloses a process for the production of block copolymers, whereby azo macroinitiators are reacted with radical-polymerizable monomers. Frings et al also discloses a process for the production of the azo macroinitiators. Even if it were assumed that the reaction product of the radical-polymerizable monomers, and the azo macroinitiator, of Frings et al correspond to polymer II and polymer I, respectively, of present Claim 1, and while Frings et al discloses that the polymerization of the radical-polymerizable monomers (preparation of polymer II) might be carried out in emulsion or dispersion, there is no explicit or implicit disclosure or suggestion of preparing the azo macroinitiator (polymer I) in emulsion, let alone in miniemulsion, as Applicants' attorney also pointed out during the interview. Frings et al discloses that the azo macroinitiators are formed **in a suitable solvent** (column 3, lines 4-6), i.e., by reaction in a solution. Suitable solvents, i.e, aromatics, ketones, esters, nitrogen containing solvents, are listed (column 5, lines 36-44), all of which are organic solvents. The exemplary azo macroinitiators of Frings

et al (Examples 4 to 7) are made in the solutions of Examples 1 to 3, which are solutions in either methyl ethyl ketone (Examples 4, 5 and 7) or in 1,4-dioxane (Example 6). There is no disclosure or suggestion to produce the azo macroinitiators in any kind of emulsion.

In addition, as Applicants' attorney explained during the interview, a miniemulsion does not form automatically, but must be subjected to some amount of shearing, as described in the specification herein, for example, at paragraph [0024], and in the definition of "miniemulsion" from Wikipedia, **submitted herewith**, and other articles in the literature, such as "What are miniemulsions" **submitted herewith** from an article by K. Landfester, at www.mpikg-golm.mpg.de/kc/landfester. Frings et al, on the other hand, discloses only stirring in the preparation of their block copolymers. See, for example, the descriptions in each of Examples 8-13, which discloses either stirring or "vigorous" stirring (with no definition of "vigorous" defined.)

During the interview, the Examiner suggested that a miniemulsion (or at least a composition having the structure of a miniemulsion) could inherently result using, in effect, a relatively high content of hydrophilic monomers. The Examiner based this finding on the disclosure in US 4,147,679 (Scriven et al) at column 18, line 3ff. However, notwithstanding the validity of the Examiner's suggestion that miniemulsions, or compositions analogous to miniemulsions with regard to droplet particle size, are obtainable without any shearing or other physical means if components are hydrophilic enough, there is no reason to believe that the aqueous dispersions and emulsions of Frings et al would have such a droplet size.

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The rejection of Claims 1-9, 11-18 and 20 under 35 U.S.C. § 112, second paragraph, as indefinite, is respectfully traversed. The Examiner finds that it is unclear what the full scope of "miniemulsion" is intended to be.

In reply, as discussed above, it is submitted that the term "miniemulsion" has a well defined meaning in the art.

The Examiner also finds that the term "molecular weight" in Claim 6 is unclear because it is not clear what type of average molecular weight it should be.

In reply, the molecular weights in terms of g/mol are intended to represent absolute molecular weights.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

Applicants respectfully submit that all of the presently-pending claims in this application are in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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Miniemulsion

From Wikipedia, the free encyclopedia

A **miniemulsion** is a special case of emulsion. A miniemulsion is obtained by shearing a mixture comprising two immiscible liquid phases, one surfactant and one co-surfactant (typical examples are hexadecane or cetyl alcohol).

The shearing proceeds usually via ultrasonication of the mixture or with a high-pressure homogenizer, which are high-shearing processes. In an ideal miniemulsion system, coalescence and Ostwald ripening are suppressed thanks to the presence of the surfactant and co-surfactant, respectively.

Stable droplets are then obtained, which have typically a size between 50 and 500 nm. The miniemulsion process is therefore particularly adapted for the generation of nanomaterials. There is a fundamental difference between traditional emulsion polymerisation and a miniemulsion polymerisation. Particle formation in the former is a mixture of micellar and homogenous nucleation, particles formed via miniemulsion however are mainly formed by droplet nucleation.

Miniemulsion polymerization

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Miniemulsions

Solid-State NMR for the characterization of complex latex morphologies
Literature

Miniemulsions

What are miniemulsion?

The formulation and application of polymeric nanoparticles enjoy great popularity in academy and industry. The technique of (macro)emulsion and microemulsion polymerization which are usually used for the preparation of polymer particle are based on a kinetic control during the preparation, the particles are built from the center to the surface, and the particle structure is governed by kinetic factors. Because of the dictate of kinetics, serious disadvantages such as lack of homogeneity and restrictions in the accessible composition have to be accepted. With the concept of "nanoreactors" where the essential ingredients for the formation of the nanoparticles on can take advantage of a potential thermodynamic control for the design of nanoparticles. This means that

the droplets have to become the primary locus of the nucleation of the polymer reaction. The polymerization in such nanoreactors should take place in a highly parallel fashion, i.e. the synthesis is performed in 10^{18} - 10^{20} nanocompartments which are separated from each other by a continuous phase. In miniemulsion polymerization, the principle of small nanoreactors is realized as demonstrated in Figure 1.

Miniemulsions are dispersions of critically stabilized oil droplets with a size between 50 and 500 nm prepared by shearing a system containing oil, water, a surfactant and a hydrophobe. Polymerizations in such miniemulsions, when carefully prepared, result in latex particles which have about the same size as the initial droplets, as could be shown by a combination of SANS, surface tension measurements and conductometry. This means that the appropriate formulation of a miniemulsion suppresses coalescence of droplets or Ostwald ripening. The polymerization of miniemulsions extends the possibilities of the widely applied emulsion polymerization and provides advantages with respect to copolymerization reactions of monomers with different polarity, incorporation of hydrophobic materials or with respect to the stability of the formed latexes. The principle of miniemulsion polymerization is schematically shown in Figure 1.

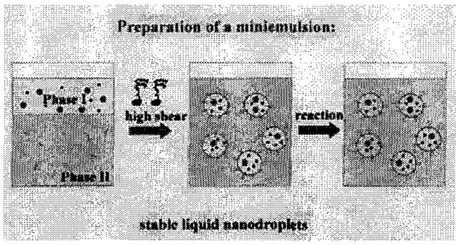

Figure 1: Principle of miniemulsion polymerization.

- K. Landfester, *Polyreactions in miniemulsions*, Macromol. Rapid Comm. **2001**, 896-936. (download as pdf file)
- K. Landfester, N. Bechthold, F. Tiarks, and M. Antonietti, *Formulation and stability mechanisms of polymerizable miniemulsions*. Macromolecules **1999**, *32*, 5222. (download as pdf file)
- K. Landfester, *Recent Developments in Miniemulsions - Formation and Stability Mechanisms*. Macromol. Symp. **2000**, *150*, 171. (download as pdf file)